doughnut and the writer's impression is that they were from two to four inches in diameter and about a half inch in thickness. Each had left behind it a track in the snow which led from the foot of the overhanging portion of the drift wall down its side into or nearly to the road. A few curved, columnar pieces of snow were also found which had fallen from the top of the drift and had rolled down the side without forming rings.

It was evident that the rings and columnar pieces had been formed from small tongues of snow which had been built out over the steep side of the drift at its top by the wind. These tongues had separated from the snow wall first at the top and had bowed themselves over until their free ends nearly or quite touched the snow at their bases with the result that they broke away and rolled down the bank.

As in the case of the attainment of large size by the "rolls" described by Karl M. Dallenbach in your issue of October 17, so in this instance the completion of the ring form was a matter of balance during the process of bending forward and rolling down since a few fragments had broken away and rolled on their sides without having attained the ring form.

While the wind seems in this case to have operated in building out the tongues of snow until they became too heavy to maintain their equilibrium it was probably not involved in the rolling process which seems to have been due altogether to gravitational attraction.

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VARIATION OF FISHES ACCORDING TO LATITUDE

To the Editor of Science: In the number of Science for April 4, Professor Starr Jordan discusses the generalization that in certain families of fishes species living in cold waters have a large number of vertebræ, while the related ones of warm waters have a small number. He interprets this as being the result of a general phylogenetic process which is favored either in warm or in cold water, depending upon whether the large or the small number of vertebræ is considered as more primitive. He has attempted to determine which is the more primitive by investigating the ontogeny of the metameres in *Sebastodes,* but has failed in this, because, as seems to be generally the case, the number of metameres characteristic of the adult is attained at a very early stage.

We would refer to the fact that such variations in number of vertebræ with temperature occur within the limits of a single species, as Heincke[1] has shown for *Clupea harengus.* Both sea-herring and coast-herring show a decrease in (1) number of vertebræ, (2) breadth of skull, (3) number of keeled scales, and (4) length of body, as one goes from the open ocean into the Baltic. We would suggest that this shows the adaptation of the large type with many vertebræ to water of great density (very saline and cold) during the critical and sensitive early stages of development, and of the small type with few vertebræ to water of low density (brackish and warm); that is, that certain characteristics connected with a large number of vertebræ make the young of the large type develop successfully in water of high density and that other characteristics connected with a small number of vertebræ make the young of the small type develop successfully in water of low density. The adults are comparatively hardy and able to seek water of suitable density. In the species *Hippoglossoides platessoides,* Collett[2] has shown that northern specimens have more rays in the dorsal and anal fins than have southern specimens. We have not been able to find that the individuals of this species on this side of the Atlantic have the numbers of fin rays varying according to latitude. Nor does the variation of fin rays correspond with the temperature or density of the bottom water in which the adults live. There are however indications that it corresponds with the density of the surface water in which the

1 "The Natural History of the Herring," 17th Ann. Rep. Fishery Board for Scotland, 1899, p. 282.

2 "Fishes," Norweg. North-Atlant. Expedn., Zoology, Vol. III., 1880, p. 148.

eggs develop. A fruitful field for investigation is open in this direction.

A. G. HUNTSMAN

CONSTANTS AND VARIABLES IN BIOLOGY

TO THE EDITOR OF SCIENCE: I have read Mr. Frank J. Kelly's letter on the substitutes for the words "homozygous and heterozygous." His argument appeals to me very particularly because we are constantly confronted with variously constructed new terms to express scientific theories. It seems to me it is by far best to give a special and restricted meaning to the ordinary words of the English language as is done in mathematics.

In this science the word "constant" is used to express a stable quantity and "variable" one that is subject to change. Why could not these two terms be bodily lifted from mathematical language into biological? The second term would quite adequately cover what Mr. Kelly calls "inconstant form."

J. R. DE LA JORRE BUENO

SCIENTIFIC BOOKS

Animal Parasites and Human Disease. By ASA C. CHANDLER, M.S., Ph.D., Instructor in Zoology, Oregon Agricultural College, Corvallis, Oregon. xiii + 570 pages. 6 × 9. 254 figures. Cloth, $4.50 net.

The work aims to present the subject of parasitology and especially its relations to the problems of human disease in such form as to make it attractive to the generally educated reader, and also useful to those less technically trained persons who have reason to utilize information in this field. The author's efforts have certainly achieved a good measure of success. His style is attractive and his presentation clear and reasonably complete. The work will be used by many who would not be inclined to refer to a more extended and more critical presentation of the subject.

After an introduction, outlining the significance of the subject and a discussion of parasitism in general, the first part of the work is devoted to a consideration of protozoa. These organisms have been grouped according to their systematic relationships. Under each heading, however, the particular organism is treated with reference to its significance in producing disease. The chapters included in this part are entitled: Introduction to Protozoa, Spirochætes, Leishman Bodies and Leishmaniasis, Trypanosomes and Sleeping Sickness, Intestinal Flagellates and Ciliates, Amebæ, Malaria, Other Sporozoa, and Obscure or Invisible Parasites.

This is the largest and certainly the most valuable part of the work, for it brings together a mass of material not readily available in this form in any other work. It points out in striking fashion the significance of recent discoveries concerning protozoa and disease. On the whole the treatment is well balanced and there are no important omissions. The author has included studies of recent date and perhaps has gone to the extreme in giving a place to discoveries so recent that their significance might well be considered doubtful, even if the observed facts are conceded to be correct. As an example of this may be cited the entry, in a note at the end of the chapter on spirochætes, of a discovery of one of these organisms in the kidney in cases of typhus and the comment that certain other bodies possibly are stages in the life history of the organism. One may reasonably doubt whether such conjectures regarding a complex and difficult field are really in place in a brief discussion intended to give the general reader clear and correct views of the present status of knowledge on these questions. It is only necessary to recall the number of organisms that have been at times supposed to be "causes" of certain diseases to see the questionable advisability of listing such suggestions before they have been thoroughly tested by other investigators.

Part II. on the Worms can not be regarded as equally successful. The chapters included in this part are entitled: Introduction to the "Worms," The Flukes, The Tapeworms, Hookworms, Other Intestinal Roundworms, Trichina Worms, Filiariæ and Their Allies, Leeches.

The material called for here is really better